New Jersey Transit:
Transition without trauma

February 1984

RAILWAY AGE

...for the new age of railways

Change in the '80s

CSX sets a fast pace

Loading the Orange Blossom Special at Taft Yard, Orlando

RAILWAY AGE
...for the new age of railways

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Inside

Marketers and innovators

LUTHER S. MILLER

"Staggers was the most important piece of railroad legislation in 100 years," CSX Chairman Hays T. Watkins observed in a recent conversation with the publisher and the editor of this magazine. "It not only allowed—it actually forced—the railroads to become modern corporations and to learn the meaning of a few new words—words like marketing and innovation."

How well and how fast CSX has learned the meaning of these words came out clearly during an interview that *Railway Age* conducted with CSX Chairman Watkins and President A. Paul Funkhouser, and in subsequent exchanges with the presidents of CSX's two rail systems, Seaboard and Chessie.

We asked about CSX's total-transportation concept: How exactly will barges and trucks fit into the picture?

We asked about car-ownership trends, coal-burning locomotives, computers, fiber optics, sales strategy, and more.

We got good answers to the questions we asked; we even got answers to questions we didn't ask and in the process learned about CSX's pioneering efforts to put its sales people on a commission basis; about a human resources data bank now in the making.

Our report on CSX's marketers and innovators begins on p. 36—second of a series of articles exploring the effects of late-20th-century change on the railroad industry.

Coming in March: Change on the right-of-way.

Fiddling around with ballast

"In any system doing its job well amid the uncertainties and imperfections of this universe, there has to be something you can fiddle with to keep the whole thing in tune..."

Thus begins Associate Editor John Armstrong's piece in this issue on the very foundation of railroading: rock ballast. If you think you know all you need to know about this subject, you are probably wrong.

Why has ballast consumption increased 75% at a time when total track mileage has been shrinking?

Why are more and more ballast cars custom-made for the job?

What is British Rail's "stone blower"—and what can it do that existing machines can't do?

Why did French National Railways, in building the TGV high-speed line, opt for ballasted track over slab track?

For answers, see the story that starts on p. 44.

Market Outlook

Equipment

CP Rail: Ordered 30 3,000-hp diesel-electric locomotives from General Motors of Canada at an estimated cost of $45 million (Canadian). Delivery is to take place during September, October and November of this year.

Trailer Train: Ordered 500 single-platform, single-axle intermodal cars, 250 from Thrall Car and 250 from United-American. Most of the cars will be equipped with UIC trucks, but some will have National Castings and some will have British Rail designs; weight of the cars will be approximately 25,500 pounds per platform. Sample cars are expected out in late March or early April, and Trailer Train expects to have all 500 units delivered in the April-May period. Meanwhile, Trailer Train's next acquisitions are expected to be five-platform articulated cars, to be followed by orders for 1,000 or more additional single-platform single-axle cars.

Facilities

Chessie System: Is investing $5.8 million in modernization of three sections of its Huntington, W. Va., Locomotive Shops—those involving electrical rotating equipment and components; wheel, axle and gear assembly; and truck assembly. The project, which is to be completed by mid-1985, involves installation of new cleaning, material handling and processing equipment along with computer-controlled gauging machinery, armature turning, undercutting balancing machinery and dynamic high-voltage current testing equipment.

Maryland Department of Transportation: Awarded a $2.3 million contract to L. B. Foster Co. for the supply of 12.3 miles of contact rail for the Baltimore Transit System. The 85-pound steel and aluminum composite rail, which supplies power to transit vehicles, will be fabricated by Foster's Transit Products Division and delivered in the second half of 1984.

Freight car orders and deliveries*

DELIVERED

	December		November	Twelve Months	
	1983	1982	1983	1983	1982
Built new by carbuilders	745**	477	615	5,570	15,515
Built new in RR shops	0	288	0	202	1,721
Built new—total	745	765	615	5,772	17,236
Rebuilt	0	174	0	100	1,500
TOTAL DELIVERED	**745**	**939**	**615**	**5,872**	**18,736**

ORDERED

To be built new by carbuilders	805	231	351	5,962	6,321
To be built new in RR shops	0	0	0	2	750
To be built new—total	805	231	351	5,964	7,071
To be rebuilt	0	0	0	100	600
TOTAL ORDERED	**805**	**231**	**351**	**6,064**	**7,671**

ON ORDER AND UNDELIVERED

	January 1	December 1	Average Backlog		
	1984	1983	1983	1983	1982
To be built new by carbuilders	2,905	4,095	3,156	3,880	7,852
To be built new in RR shops	0	200	0	23	772
To be built new—total	2,905	4,295	3,156	3,903	8,624
To be rebuilt	0	0	0	23	314
TOTAL ON ORDER	**2,905**	**4,295**	**3,156**	**3,926**	**8,938**

*Locomotive figures unavailable at press time.
**Includes 57 estimated
Source: American Railway Car Institute

Estimated ownership—all revenue freight cars

December 1, 1983 vs. December 1, 1982

		Box	Covered Hoppers	Gondola	Hopper	Flat	Refg	All Others	TOTAL
Class I RRs	1983	273,258	164,281	129,715	284,096	83,914	53,699	22,067	1,011,030
	1982	232,214	167,604	135,483	293,972	86,502	57,984	23,194	1,046,953
Class II & S&T Cos.*	1983	49,154	9,922	10,194	11,149	5,019	3,343	3,037	91,818
	1982	51,105	9,525	10,444	12,257	4,778	3,404	3,342	94,855
Railbox-Railgon	1983	15,089		3,998					19,087
	1982	24,922		3,999					28,921
RRO&C** Refgs.	1983						5,203		−5,203
	1982						4,231		4,231
Private	1983	521	129,579	27,945	21,543	53,547	2,022	185,486	420,643
	1982	495	129,732	27,908	21,240	53,794	3,086	188,702	424,957
GRAND TOTAL	1983	338,022	303,782	171,852	316,788	142,480	64,267	210,590	1,547,781
	1982	358,736	306,861	177,834	327,469	145,074	68,705	215,238	1,599,917

*Class II railroads and switching terminal companies.
**Railroad owned and controlled refrigerator car lines.
Source: Transportation Division, AAR.

Market Indicators

DRI Railroad Industry Monitor

Data Resources, Inc., expects economic growth to continue in 1984, but the period of explosive growth that marked the 1983 recovery will give way to economic expansion at a more moderate rate. Auto sales and steel will show strength; retail auto sales are forecast to top 10 million units, and raw steel production is expected to exceed 100 million tons. Housing and agriculture will face some problems this year; DRI expects housing starts to peak by mid-year and then decline as deficit pressures push interest rates upward. The strong dollar will continue to hamper grain exports.

Total Class I rail traffic will increase by almost 75 million tons over 1983 levels as coal and ore traffic rise sharply, says DRI. Growth in intermodal traffic is predicted to slow down, from over 20% in 1983 to about 10% this year as railroads face equipment contraints and work to improve profitability to justify new investments.

	1983:2	1983:3	1983:4	1984:1	1984:2	1984:3	1984:4
Ecomonic Indicators (Annualized rates)							
Real GNP (% change)	9.7	7.6	4.9	5.0	4.2	4.2	3.9
Industrial Production (1967 = 1.0)	1.44	1.52	1.57	1.60	1.62	1.64	1.65
Housing Starts (mil. units)	1.68	1.79	1.73	1.76	1.80	1.82	1.73
Retail car sales (mil. units)	9.2	9.3	9.6	9.8	10.1	10.4	10.5
Raw steel production (mil. tons)	21.7	21.1	22.9	26.3	28.1	25.6	25.8
Total Class I Rail Traffic							
(millions of tons)	312.8	329.9	323.0	320.3	339.6	337.5	337.1
Key Commodities							
Grain	26.7	36.8	35.1	34.8	32.1	27.5	29.9
Coal	118.0	124.0	125.4	122.1	129.8	130.7	138.2
Pulp & paper	9.4	9.3	9.2	9.5	9.5	9.3	9.1
Chemicals	24.0	24.6	25.3	27.4	26.5	25.8	25.8
Motor Vehicles	5.3	4.7	5.5	5.5	6.5	4.9	5.7

Source: Data Resources, Inc., Jan. 16, 1984

Revenue freight carloadings

Commodity	Jan. 7 week	% change from 1983	Dec. 31 week	% change from 1982	Dec. 24 week	% change from 1982	Dec. 17 week	% change from 1982
Grain	28.770	8.1	20.370	20.0	22.567	17.3	29.571	26.2
Other farm products	4.147	(2.9)	2.895	(24.8)	3.293	(11.3)	3.801	(25.6)
Metallic ores	9.486	(9.3)	9.358	(3.2)	11.775	13.7	13.857	17.2
Coal	82.332	(12.3)	56.262	(7.8)	83.406	2.7	108.913	5.8
Crushed stone, gravel and sand	6.204	(5.4)	4.315	(17.6)	6.879	59.9	9.126	24.2
Nonmetallic minerals	9.295	4.5	8.377	(7.4)	10.346	23.9	11.118	11.1
Grain mill products	10.051	(14.9)	8.253	(17.8)	10.364	3.0	10.862	(10.7)
Food and kindred products	9.158	(24.5)	7.335	(26.1)	9.688	(3.9)	11.319	(4.6)
Primary forest products	11.868	(11.6)	7.186	(23.5)	11.250	45.4	14.514	22.3
Lumber and wood products (except furniture)	5.167	(5.3)	4.466	(5.0)	6.773	36.4	6.988	12.1
Pulp, paper and allied products	12.708	(12.1)	10.291	(0.7)	14.918	21.7	15.141	1.4
Chemicals and allied products	21.032	(0.2)	20.031	(0.4)	22.563	38.8	23.468	23.9
Petroleum products	4.066	(14.6)	3.667	(7.4)	4.542	20.8	4.788	1.5
Stone, clay and glass products	7.960	(6.2)	5.999	(12.9)	7.559	16.0	9.820	25.1
Coke	4.432	5.5	4.206	14.8	4.787	15.4	5.268	44.1
Metals and products	7.246	12.1	7.639	52.4	8.248	75.4	8.553	30.1
Motor vehicles and equipment	13.379	21.0	7.645	46.7	16.468	90.1	21.575	61.8
Waste and scrap materials	6.694	11.0	4.882	18.4	7.641	61.3	9.195	41.7
Forwarder and shipper assn. traffic	7.573	27.0	6.067	22.0	8.377	42.2	10.015	34.2
All other carloads	40.720	7.0	33.793	12.6	48.277	37.1	54.985	15.0
LCL traffic	180	(81.5)	126	(75.5)	200	(66.5)	231	(76.8)
Total Cars Loaded	**302.468**	**(4.0)**	**233.163**	**(0.7)**	**319.847**	**21.8**	**383.108**	**14.2**

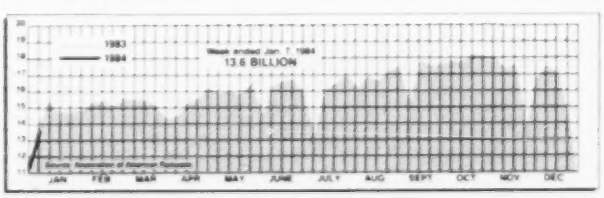
Estimated revenue ton-miles (billions)	1983	1982	% change from 1982
52 weeks	825.5	797.8	3.5
	1984	**1983**	**% change from 1983**
1 week	13.6	14.1	(3.2)

Piggyback loadings

Week ended	Cars loaded 1983	% increase from 1982	Trailers containers 1983	% increase from 1982
December 10	48.965	20.1	89.620	24.7
December 17	50.276	21.3	91.791	25.5
December 24	43.456	37.9	79.388	43.5
December 31	30.966	11.1	56.463	18.6
Cumulative total,				
52 weeks	2.338.527	21.8	4.078.454	20.1

Rail freight traffic trends

Billion ton miles (Estimated)



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West House
West Street
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Kent, ME13 7JB
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Telex: 96118 ANZEEC G

France, Belgium and French-speaking Switzerland
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32 Rue Desbordes-Valmore
75116 Paris, France
Tel: 504 97 94

Germany, Austria, Eastern Europe, and German-speaking Switzerland
Siegfried D. Kamper
P.O. Box 300468
6054 Rodgau 3, West Germany
Tel: 6106 72968
Telex: 4189 036

Italy
F. Pecori Giraldi
Promark International
Via G. Frua 8
20146 Milan, Italy
Tel: 46 35 18

Japan
C.H. Yiu
Sun-Gain Shia Ltd.
Kimuraya-Makino Building
1-15-8 Shiba Minato-ku
Tokyo, Japan
Tel: 453 7361

Korea
Pyung Youn Huh
Intra Media Co. Ltd.
CPO Box 6687
Seoul, Korea
Tel: 28 5345

South America
Marcos F. Pipan
Juramento 5274 2 A
1431 Buenos Aires, Argentina
Telex: 22612 TURBO AR

Southeast Asia
Timothy C. Herberlein
CCI Asia - Pacific
Suite 500 Dominion Centre
43-59 Queen's Road East
Hong Kong
Tel: 5-270639, 5-270667
Telex 75368 AMRHK

Watching Washington

18 railroads post positive returns

The Class I railroads—individually and as a group—fell far short in 1983 of earning the 17.8% return on investment (ROI) that Congress has said they need to earn. But 18 out of the 30 Class I's reporting to the ICC last year did earn some kind of positive ROI for the 12 months ended Sept. 30, a not inconsiderable feat considering the state of the national economy, which was just then beginning to recover from its worst recession since the Great Depression. For the industry as a whole, the rate of return for that period was 3.13%. Railroads whose positive ROI's contributed to that average are listed below:

Burlington Northern	7.82
Missouri-Kansas-Texas	7.24
Kansas City Southern	6.01
Chicago & North Western	6.01
Southern	5.78
Missouri Pacific	4.76
Norfolk & Western	4.52
Chesapeake & Ohio	4.27
Union Pacific	4.26
Illinois Central Gulf	4.10
Seaboard System	3.52
Denver & Rio Grande Western	3.43
Elgin, Joliet & Eastern	2.78
St. Louis Southwestern	2.54
Santa Fe	2.38
Soo Line	2.24
Conrail	1.56
Bessemer & Lake Erie	0.05

NS and CSX eye Conrail

It was too early to call it a mating dance. But both Norfolk Southern and CSX in January went public with cautious expressions of interest in forming a union with Conrail.

Norfolk Southern was first, with a tersely worded Jan. 6 statement that it was starting studies "looking toward the possible inclusion of Conrail" in its system.

CSX's immediate comment was "no comment"—but five days later CSX Chairman and CEO Hays T. Watkins said his board of directors had decided to undertake a "thorough review" of Conrail with an eye to possible acquisition.

Congress has ordered Conrail sold only as a single, operating entity, at least through mid-1984, if it passes certain profitability tests—and Conrail has so far passed those tests with ample margins. The railroad had profits estimated at $275 million in 1983.

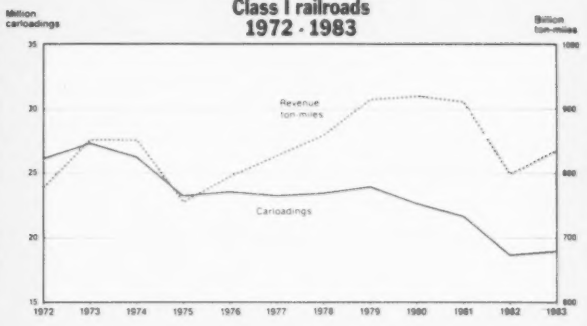
Until last month, only two formal expressions of interest in Conrail had been made. One came from the Santa Fe, which subsequently backed off after it reached a merger agreement with Southern Pacific. The other was an offer from Conrail employees—a package of a little bit of cash and a lot of wage concessions and tax-benefit waivers which has not aroused much excitement at DOT.

Earlier this year, then-FRA Administrator Robert W. Blanchette said the purchaser of Conrail would have to have "a deep pocket" because "there are no refunds on this sale." Both NS and CSX, which are among the most prosperous railroads in North America, would seem eminently qualified on that score.

But competitive aspects of a Conrail takeover by either of its big neighbors to the south are something else, as a number of railroad financial analysts have pointed out. The competitive issue is also being seized upon by those who are promoting an employee buyout. Brian Freeman, financial adviser to the Railway Labor Executives' Association, which put together the employee bid (involving only $500 million in cash but valued by RLEA at a total of $2 billion), had this to say after NS and CSX made their tentative moves: "I would not envision purchase by either of them, because that would be counter to the interest of the public, rail service in the Northeast, and the employees. The whole purpose of the government investing $7 billion since 1976 was to maximize service. Acquisition by either of the railroads would result in a substantial reduction in service."

Freight railroading in 1983: A statistical review

Freight traffic trends Class I railroads 1972 - 1983



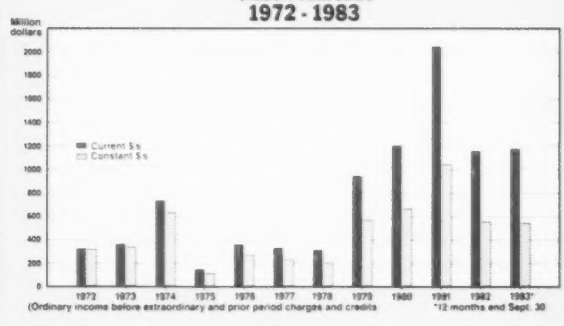
Methods of shipping motor vehicles from factories 1972-1982

Year	Vehicles shipped	Highway %	Railroad %
1972	11,270,000	47.8	52.2
1973	12,637,000	48.0	52.0
1974	10,058,000	44.8	55.2
1975	8,985,000	46.4	53.9
1976	11,477,000	48.5	51.5
1977	12,639,000	49.3	50.7
1978	12,871,000	47.9	52.1
1979	11,456,000	50.1	49.9
1980	8,067,000	46.8	53.2
1981	7,956,000	43.6	56.4
1982	6,956,000	46.1	53.9

Source: Motor Vehicle Manufacturers Association of the United States

Revenue Carloadings of T-O-F-C traffic Class I railroads 1972 - 1983

Net income Class I railroads 1972 - 1983



(Ordinary income before extraordinary and prior period charges and credits

*12 months end Sept. 30

Freight traffic 1972 - 1983

Year	Revenue carloadings (thousands)	Piggyback carloadings (thousands)	Revenue ton-miles (millions)
1972	26,105	1,448	776,746
1973	27,338	1,631	851,809
1974	26,184	1,610	850,961
1975	23,218	1,308	754,252
1976	23,457	1,506	794,059
1977	23,173	1,689	826,292
1978	23,355	1,841	858,105
1979	23,892	1,858	913,669
1980	22,598	1,687	918,621
1981	21,613	1,752	910,169
1982	18,498	1,920	797,759
1983	18,800	2,350	*825,500

* Estimated

Condensed income account: 1972, 1982, 1983

	1972 (millions)	1982 (millions)	12 mos. to 9 30 83 (millions)
Total Operating Revenues	$13,410	$27,504	$26,536
Total Operating Expenses	12,528	26,490	25,213
Net Operating Revenues	881	1,013	1,323
Other Income	393	1,667	1,389
Miscellaneous Deductions	101	215	231
Interest Charges & Amortization	568	1,085	1,037
Tax Accruals & Other Deductions	287	227	274
Net Ordinary Income	319	1,152	1,170
Net Railway Operating Income	654	742	1,044
Rate of Return	2.34%	2.11%	3.16%

Carloadings of major commodities 1983 vs. 1982

	1983 Cars	1982 Cars		Incr/Decr. 1983 vs. 1982 Cars	Percent
Grain	1,379,864	1,265,357	I	114,507	9.0
Other farm products	205,009	217,748	D	12,739	5.9
Metallic ores	823,569	814,872	I	8,697	1.1
Coal	5,210,459	5,628,723	D	418,264	7.4
Crushed stone, gravel and sand	503,360	475,487	I	27,873	5.9
Nonmetallic minerals	585,106	504,013	I	81,093	16.1
Grain mill products	593,047	619,242	D	26,195	4.2
Food and kindred products	605,876	681,137	D	75,261	11.0
Primary forest products	738,536	766,097	D	27,561	3.6
Lumber and wood products except furniture	367,864	308,208	I	59,656	19.4
Pulp, paper and allied products	778,126	829,139	D	51,013	6.2
Chemicals and allied products	1,198,939	1,117,290	I	81,649	7.3
Petroleum products	239,126	243,746	D	4,620	1.9
Stone, clay and glass products	533,574	508,869	I	24,725	4.9
Coke	261,623	231,854	I	29,769	12.8
Metals and products	433,505	454,063	D	20,558	4.5
Motor vehicles and equipment	867,157	713,269	I	153,888	21.6
Waste and scrap materials	420,594	404,564	I	16,030	4.0
Forwarder and shipper association traffic	452,809	428,874	I	23,935	5.6
All other carloads	2,586,759	2,219,459	I	367,300	16.5
LCL traffic	15,250	66,154	D	50,904	76.9
Total Cars Loaded	18,800,172	18,498,165	I	302,007	1.6

Capital expenditures and retained funds 1972 - 1983

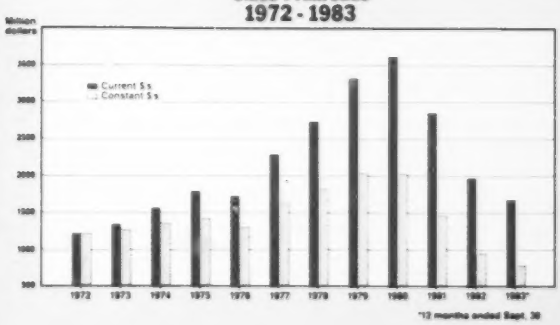
Gross capital expenditures

Year	Rolling stock (millions)	Other facilities (millions)	Total (millions)	Retained funds[1] (millions)	Excess of capital expenditures over retained funds (millions)
1972	$ 848	$ 368	$1,216	$ 923	$ 293
1973	893	449	1,342	964	378
1974	1,038	527	1,565	1,091	475
1975	1,303	486	1,790	622	1,168
1976	1,175	550	1,725	683	1,042
1977	1,540	751	2,291	763	1,527
1978	1,883	855	2,738	727	2,011
1979	2,285	1,039	3,323	1,390	1,933
1980	2,346	1,275	3,621	1,839	1,782
1981	1,521	1,334	2,855	3,130	(276)[2]
1982	713	1,262	1,975	1,725	250
12 mos. to 9.30.83	421	1,259	1,681	1,922	(241)[2]

[1] Retained funds represent income before extraordinary items, plus deferred taxes and depreciation and retirement charges, less cash dividends and equity in undistributed earnings of affiliated companies.
[2] The reversal of a long-term trend in two of the past three years was due to increases in ordinary income and deferred taxes and declines in capital outlays resulting from equipment surpluses.

Note: Capital expenditures of Class I railroads do not include expenditures for railroad equipment made by private car companies and lessors.

Capital expenditures Class I railroads 1972 - 1983



*12 months ended Sept. 30

Operating revenues 1972, 1982, 1983

	1972 (millions)	1982 (millions)	12 mos. to 9.30.83 (millions)
Freight	$12,670	$25,627	$25,129
Passenger	257	573	367
All other	483	1,303	1,040
TOTAL	$13,410	$27,504	$26,536

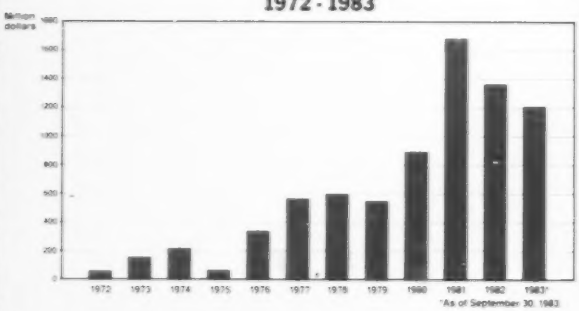
Note: Mail and express included in freight revenue.

Railway current ratio 1972 - 1983

Dec. 31	Current assets (millions)	Current liabilities[1] (millions)	Current ratio
1972	$3,611.6	$3,672.3	1.0
1973	4,055.9	3,898.0	1.0
1974	4,553.2	4,333.7	1.1
1975	4,640.8	4,572.9	1.0
1976	5,292.8	4,950.1	1.1
1977	5,985.7	5,414.8	1.1
1978	6,873.5	6,270.8	1.1
1979	7,779.6	7,224.5	1.1
1980	8,676.4	7,779.0	1.1
1981	9,665.1	7,973.5	1.2
1982	8,813.4	7,441.7	1.2
9.30.83	8,281.5	7,064.1	1.2

[1] Includes debt due within one year.

Net working capital 1972 - 1983



*As of September 30, 1983

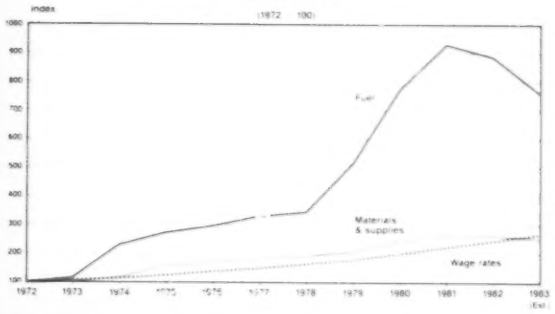
Net railway operating income, rate of return on net investment and net income 1972 - 1983

Year	Net railway operating income [a] (millions)	Rate on return on net investment [a]	Net income after fixed charges [b] (millions)	Net income in constant 1972 dollars (millions)
1972	$ 654	2.34%	$ 319	$ 319
1973	650	2.33	359	340
1974	768	2.70	730	635
1975	351	1.20	144	115
1976	452	1.60	355	269
1977	343	1.24	326	233
1978	427	1.52	307	204
1979	837	2.87	938	574
1980	1,312	4.13	1,192	668
1981	1,361	3.98	2,041	1,046
1982	742	2.11	1,152	557
12 mos to 9.30.83	1,044	3.16	1,170	548

a. After provision for deferred taxes.
b. After provisions for deferred taxes and including equity in undistributed earnings of affiliated companies.

Note: Statistics shown above and elsewhere in the tables are for Class I line-haul railroads, excluding National Railroad Passenger Corp. (Amtrak) and Auto Train Corp., unless otherwise indicated.

Railroad cost trends
Class I railroads
1972 - 1983



Spot price indices of fuel and materials and supplies
(1977 = 100)

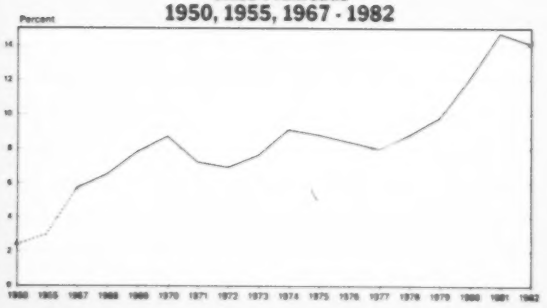
Date	Diesel fuel	Materials and supplies: Forest products	Materials and supplies: Iron & steel	Total materials and supplies: Misc.	Total materials and supplies: Excluding fuel	Total materials and supplies: Including fuel
8 15 81	288.2	156.4	148.1	145.6	148.0	200.2
11 15 81	287.7	155.3	147.3	148.4	148.6	200.2
2 15 82	283.0	155.5	143.1	146.9	146.1	197.0
5 15 82	258.0	153.1	141.1	147.3	145.0	187.1
8 15 82	268.9	152.0	140.7	147.5	144.7	191.1
11 15 82	283.0	149.2	135.1	146.8	141.4	193.9
12 15 82	236.4	151.0	133.1	145.9	140.4	176.5
5 15 83	230.1	151.2	130.9	145.1	139.1	173.4
8 15 83	236.7	155.4	129.1	144.7	138.9	175.6
11 15 83	240.0	154.7	129.1	141.6	137.2	175.7

New and rebuilt equipment installed
1972 - 1983

Year	Freight Cars	Passenger-train cars	Diesel-electric units
1972	49 983	347	1 577
1973	59 170	92	1 384
1974	67 409	100	1 395
1975	73 992	272	840
1976	53 630	358	567
1977	53 817	158	992
1978	68 774	44	1 378
1979	96 532	116	1 978
1980	86 628	160	1 666
1981	45 925	119	686
1982	18 736	102	501
11 mos 1983	8 127	n.a.	209

n.a. Not available.
Note: Freight car installations include cars of all railroads and private car lines. Passenger-train car and diesel-electric unit installations include Amtrak for all years and Auto Train for the years 1972-1977.

Average interest rates on equipment obligations issued
Class I railroads
1950, 1955, 1967 - 1982

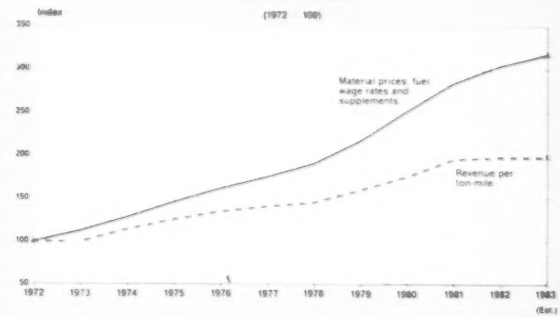


Prices and revenue averages
1972 - 1983

Year	Producer price index for railroad equipment[1] (1972 = 100)	Price index for total railroad freight[1] (1972 = 100)	Railroad revenue per ton-mile (cents)	Railroad revenue per ton-mile (1972 = 100)
1972	100.0	100.0	1.618	100.0
1973	104.7	102.5	1.617	99.9
1974	127.3	118.7	1.853	114.5
1975	156.3	134.3	2.041	126.1
1976	168.3	148.0	2.191	135.4
1977	181.4	157.9	2.286	141.3
1978	196.3	169.0	2.358	145.7
1979	215.5	192.9	2.599	160.6
1980	243.3	225.6	2.852	176.3
1981	261.1	259.8	3.155	195.0
1982	269.2	278.7	3.212	198.5
1983 est	274.4	281.9	3.205	198.1

Bureau of Labor Statistics, USDL

Revenue and cost trends
Class I railroads
1972 - 1983



Rail revenue adequacy standard
1978 - 1982

Year	ICC Approved Cost of Capital Debt-Equity: Debt	Equity	Ratio	Total	Rail Rate of Return on Net Investment[1]
1978	7.0%	13.0%	40-60	10.6%	1.52%
1979	9.0	13.5	40-60	11.7	2.87
1980	10.0	13.5	40-60	12.1	4.13
1981	13.7	18.3	40-60	16.5	3.98
1982	14.0	19.8	37-63	17.7	2.11

[1] Net railway operating income as a percent of average net investment, beginning and end of year.

Railroad cost recovery index
1972 - 1983

(1977 = 100)

Year	Labor (Wages & Supplements)	Fuel	Materials & Supplies	Labor, Fuel & M&S Combined	Other Costs	Railroad Cost Recovery Index
1972	61.0	30.1	54.7	57.0	n.a.	n.a.
1973	69.1	35.0	56.6	64.0	n.a.	n.a.
1974	75.2	69.8	65.4	73.1	n.a.	n.a.
1975	82.3	82.6	87.6	83.2	n.a.	n.a.
1976	92.2	89.9	93.6	92.2	n.a.	n.a.
1977	100.0	100.0	100.0	100.0	100.0	100.0
1978	109.8	104.4	106.2	108.6	108.8	108.5
1979	120.8	155.5	116.4	123.5	119.0	122.1
1980	132.5	233.1	134.2	143.3	132.6	140.1
1981	149.4	280.2	145.2	162.2	147.2	157.7
1982	167.0	267.1	146.3	173.6	155.7	168.3
1983	181.5p	232.2	140.0	179.1p	n.a.	n.a.

n.a. — Not Available
p—preliminary

NOTE

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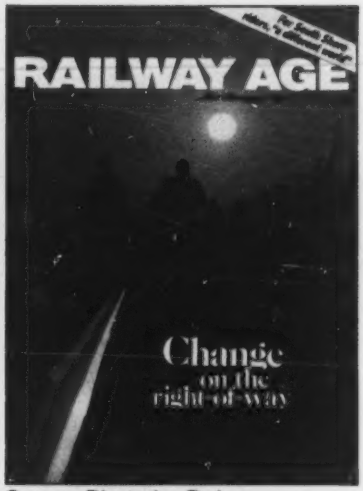

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Maintaining track to the exacting standards of mega-railroading demands better materials, better machines—and, above all, better productivity.

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The *Railway Age*/Unit Rail Anchor directory offers a comprehensive listing, with names and phone numbers, of key contacts in the nation's capital.

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Efforts to achieve maximum efficiency in intermodal operations moved a step forward with the completion of aerodynamic tests on TOFC/COFC equipment.

63 Deseret Western: One of a kind

The nation's newest railroad, a western coal hauler, borrowed the best ideas from other electrified lines, and then added its own variations.

65 Track Train Dynamics Newsletter

The case for a High Productivity Integral Train will be presented at a meeting in Chicago April 3. Present and potential suppliers are invited.

69 CSS&SB: A new world

New cars, a new yard, and a refurbished shop have transformed the South Shore from a veritable museum into a smoothly-functioning interurban.

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Inside

The changing right-of-way

LUTHER S. MILLER

It is not difficult to illustrate the dramatic change that has taken place on the railroad right-of-way in the last century or so. Just look at the pictures below, which graphically depict the change in emphasis from muscle to machine. (That change, incidentally, has come about fairly recently: It was only 30-odd years ago that the Southern's Bill Brosnan drew his own rough sketch of the first track machine—precursor of an m/w mechanization trend that has revolutionized maintenance practices. And let the record show that Southern—now part of Norfolk Southern—continues to set a pioneering pace: Last year it fielded the first fully-automatic track machine, a tamper, with results so successful that an additional six automatic tampers have been ordered; the technology is now being extended to automatic machines for applying and tightening rail anchors.)

Other changes are taking place on the right-of-way that are less easy to depict graphically. They are taking place, for example, in railroad computer rooms, where maintenance cycles are now electronically plotted; where track equipment is subjected to sophisticated tests for performance and return on investment.

In this issue's cover article—Change on the Right-of-Way—Senior Editor Gus Welty explores a number of areas that are not easily susceptible to pictorial illustration—for example, the rising role of rail lubrication (which could cut fuel costs by up to 10%, according to some projections); more efficient m/w equipment shops; m/w machine standardization; better material handling. And more.

This third article in our year-long series on *Change* starts on p. 37. Coming in April: Change on the Union Pacific.

Laying track in the 1870s...

...and in the 1980s

Market Outlook

Equipment

New York Metropolitan Transportation Authority: Ordered 16 push-pull commuter cars, valued at more than $16 million (Canadian), from Bombardier for service on Metro North's New Haven Line. MTA earlier ordered 19 similar cars for Metro North's Upper Hudson line (RA, Jan., p. 12).

Ortner Freight Car Co.: Has received orders for 757 cars costing $36.1 million, with options for 195 additional cars priced at $14.9 million. The purchasers: U.S. Army, 174 heavy-duty flat cars (with option for 150 more) for delivery in late 1984 and early 1985; Tennessee Valley Authority, 198 Rapid Discharge coal cars for delivery in the second and third quarters of 1984; Lower Colorado River Authority, 100 rotary dump gondola cars for delivery in the first half of 1984; Florida East Coast, 100 Rapid Discharge aggregate cars for delivery in the second quarter of 1984; Tucson Electric Power Co., 185 rotary dump gondola cars for delivery starting in January 1985, with an option for 45 additional cars. Also, Intermountain Power Project has announced that it plans to order 273 aluminum Rapid Discharge hopper cars from Ortner.

Turkish Railways Enterprise: Ordered 52 diesel-electric locomotives from General Motors. GM's Electro-Motive Division will build 39 units (designated G26CW-2) and provide the other 13 as partial knock-down kits or component sets for overseas assembly. Deliveries on the order, which is valued at about $50 million, are scheduled for fourth-quarter 1984. Also involved is a long-term technical assistance program leading to local production of locomotives.

Facilities

Greater Cleveland Regional Transit Authority: Union Switch & Signal Division of American Standard is the apparent low bidder, at $6.8 million, for signaling GCRTA's West Park Station to downtown Cleveland Union Terminal Line.

Freight cars and locomotives

	January 1984	1983	December 1983
DELIVERED			
Built new by carbuilders	415	440	745
Built new in RR shops	0	54	0
Built new—total	415	494	745
Rebuilt	0	0	0
TOTAL DELIVERED	**415**	**494**	**745**
Locomotives (new and rebuilt)	15	10	109
ORDERED			
To be built new by carbuilders	2,736	501	805
To be built new in RR shops	0	0	0
To be built new—total	2,736	501	805
To be rebuilt	0	0	0
TOTAL ORDERED	**2,736**	**501**	**805**

ON ORDER AND UNDELIVERED	February 1 1984	1983	January 1 1984
To be built new by carbuilders	5,650	4,155	3,271
To be built new in RR shops	0	146	0
To be built new—total	5,650	4,301	3,271
To be rebuilt	0	0	0
TOTAL ON ORDER	**5,650**	**4,301**	**3,271**
Locomotives (new and rebuilt)	85	30	91

Twelve-month locomotive figures for 1983, which were unavailable at press time for the February issue, were: Deliveries, 318 (compared with 520 in 1982); and Average Backlog, 116 (compared with 137 in 1982).

Estimated ownership—all revenue freight cars

January 1, 1984 vs. January 1, 1983

		Box	Covered Hoppers	Gondola	Hopper	Flat	Refg.	All Others	TOTAL
Class I RRs	1984	271,396	164,466	129,423	282,930	83,757	53,281	21,912	1,007,165
	1983	278,024	166,150	134,763	293,306	86,011	57,466	23,296	1,039,016
Class II & S&T Cos.*	1984	48,953	9,632	10,257	11,209	5,010	3,286	3,048	91,395
	1983	49,613	9,336	10,349	11,238	4,667	3,407	2,842	91,452
Railbox-Railgon	1984	15,088		3,998					19,086
	1983	24,924		3,998					28,922
RRO&C** Refgs.	1984						5,372		5,372
	1983						4,313		4,313
Private	1984	319	129,074	27,876	21,666	53,524	1,766	185,035	419,260
	1983	408	130,736	27,821	21,098	53,830	2,857	187,084	423,834
GRAND TOTAL	1984	335,756	303,172	171,554	315,805	142,291	63,705	209,995	1,542,278
	1983	352,969	306,222	176,931	325,642	144,508	68,043	213,222	1,587,537

*Class II railroads and switching terminal companies.
**Railroad owned and controlled refrigerator car lines.
Source: Transportation Division, AAR.

Market Indicators

DRI Railroad Industry Monitor

As the recovery continues, the need for change in national economic policy is growing. The short-term outlook is good, with recovery beginning to touch industries like steel that were not helped by the early stages of recovery, but record federal deficits threaten to choke off growth after 1985. By keeping interest rates and the foreign exchange value of the dollar high, the federal deficits strike two blows at the economy, reducing domestic demand for interest-sensitive goods like autos and houses and reducing export demand for U.S. products.

The DRI rail traffic forecast reflects the impacts of the deficits. Grain traffic will be weak in the second half of 1984, as the strong dollar continues to make it hard for U.S. grains to compete in world markets. Coal traffic will rebound as domestic demand for electricity rises, but high interest rates will limit the demand for new housing and keep lumber carloadings from growing much beyond present levels. Interest rates will also continue to make shippers put a premium on high levels of service, a major factor behind the decline of rail paper traffic.

	1983:2	1983:3	1983:4	1984:1	1984:2	1984:3	1984:4
Ecomonic Indicators (Annualized rates)							
Real GNP (% change)	9.7	7.6	4.5	5.6	3.9	4.3	4.1
Industrial production (1967 = 1.0)	1.44	1.52	1.56	1.59	1.61	1.63	1.65
Housing starts (mil. units)	1.68	1.79	1.69	1.77	1.80	1.82	1.74
Retail car sales (mil. units)	9.2	9.3	9.9	9.8	10.1	10.4	10.5
Raw steel production (mil. tons)	21.7	21.1	22.9	26.3	28.1	25.6	25.8
Total Class I Rail Traffic							
(millions of tons)	312.8	329.9	326.4	320.9	340.2	338.2	338.0
Key Commodities							
Grain	26.7	36.8	36.2	34.8	32.1	27.5	29.9
Coal	118.0	124.0	124.1	122.1	129.8	130.7	136.2
Pulp & paper	9.4	9.3	9.2	9.5	9.5	9.2	9.1
Chemicals	24.0	24.6	25.5	27.7	26.8	26.0	26.2
Motor vehicles	5.3	4.7	5.6	5.5	6.3	4.9	5.6

Source: Data Resources, Inc., Feb. 10, 1984

Revenue freight carloadings

Commodity	Feb. 11 week	% change from 1983	Feb. 4 week	% change from 1983	Jan. 28 week	% change from 1983	Jan. 21 week	% change from 1983	Jan. 14 week	% change from 1983
Grain	29,523	5.9	32,426	32.0	31,502	29.3	30,809	12.8	33,186	16.4
Other farm products	5,186	43.1	4,879	13.5	5,151	(15.9)	4,488	(27.9)	5,315	17.3
Metallic ores	13,558	33.9	11,732	26.4	12,718	19.3	13,226	24.9	11,725	5.9
Coal	112,822	17.7	112,354	17.4	108,003	12.9	97,506	1.2	107,940	5.0
Crushed stone, gravel and sand	8,439	19.5	8,653	16.9	7,952	15.9	7,456	12.7	7,792	5.0
Nonmetallic minerals	12,220	18.8	12,804	22.3	11,635	8.3	12,050	18.3	11,364	17.3
Grain mill products	12,048	0.0	11,982	0.7	12,041	0.1	12,215	(0.5)	12,075	3.2
Food and kindred products	10,825	19.2	11,443	(13.5)	11,087	(11.1)	11,017	(11.8)	11,844	3.2
Primary forest products	14,088	4.9	14,767	3.0	12,872	(10.9)	12,847	(4.6)	13,738	9.9
Lumber and wood products (except furniture)	7,679	10.5	7,696	10.6	7,517	2.7	6,982	(0.2)	7,019	6.8
Pulp, paper and allied products	15,233	1.1	15,235	(2.0)	15,258	0.4	14,602	(2.8)	14,750	0.9
Chemicals and allied products	26,239	11.6	25,960	12.6	25,684	14.6	24,488	10.4	25,199	6.0
Petroleum products	5,236	18.1	5,103	22.6	5,309	11.8	5,050	2.4	5,222	6.7
Stone, clay and glass products	10,150	17.7	10,461	17.8	9,154	6.7	8,561	1.1	9,793	12.2
Coke	5,059	14.4	4,786	12.1	4,534	12.0	4,542	6.0	4,763	21.5
Metals and products	10,009	9.1	10,516	19.9	9,503	27.1	9,147	35.6	9,164	32.7
Motor vehicles and equipment	21,135	35.1	20,496	34.0	20,474	31.8	20,600	47.7	19,831	48.0
Waste and scrap materials	10,653	39.5	10,407	46.9	10,234	50.3	9,967	40.1	9,832	39.0
Forwarder and shipper assn. traffic	10,401	8.8	10,544	18.1	10,373	18.8	9,687	34.6	9,505	32.7
All other carloads	54,295	10.5	54,654	17.0	54,409	18.9	51,341	20.6	51,768	18.2
LCL traffic	284	33.3	317	52.4	320	45.5	283	81.4	254	29.6
Total Cars Loaded	**395,082**	**13.4**	**397,215**	**16.5**	**386,030**	**13.4**	**66,864**	**9.5**	**382,079**	**10.1**

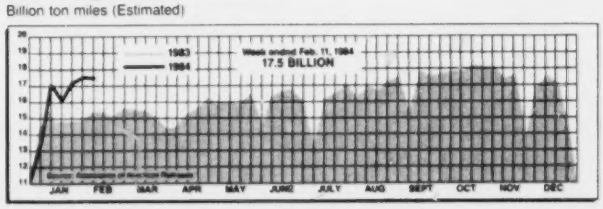
Estimated revenue ton-miles (billions)	1984	1983	% change from 1983
6 weeks	99.1	89.6	10.6

Piggyback loadings

Week ended	Cars loaded 1984	% increase from 1983	Trailers/ containers 1984	% increase from 1983
January 7	37,792	10.5	65,853	13.1
January 14	47,580	19.7	84,367	26.9
January 21	46,729	23.0	81,607	25.8
January 28	50,017	18.9	87,280	20.2
February 4	50,502	19.6	89,026	22.8
Cumulative total, 5 weeks	233,140	18.8	408,561	22.1

Rail freight traffic trends

Billion ton miles (Estimated)



NOTE

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